2MASS Progress Report June 24, 1996

The Two Micron All Sky Survey (2MASS) will map the entire sky in the infrared J(1.2μM), H(1.6μM), and Ks (2.2μM) photometric bands using two dedicated 1.3 meter telescopes (one for each hemisphere) equipped with three-band infrared cameras. The astronomical community will receive the results of this survey in the form of a point source catalog (containing more than 100 million objects), an extended source catalog (containing more than a million objects), and an image product covering the entire sky.

This report summarizes progress from September 14, 1995 to June 20, 1996. During this period the focus of the 2MASS project was on the fabrication and testing of the prototype three band camera and on the fabrication of the Mt. Hopkins telescope and its associated facilities. The Infrared Processing and Analysis Center (IPAC) has continued the development of 2MASS data processing and management in preparation for the scheduled March 1997 start of survey operations on Mt. Hopkins.

Project Reviews:

The first of the project reviews specified in the NASA-UMASS MoU concerning the 2MASS project took place at the University in November, 1995. The project has responded to the requests and concerns that were contained in the report of the external review board.

Survey Cameras:

During the period covered by this report the 2MASS project has fabricated the three-array prototype camera for the survey. It is anticipated that this camera will become the Northern Hemisphere survey camera. The camera saw first light in January 1996. Since that time the system has been undergoing lab tests aimed at aligning the system and ascertaining whether the system will meet its specifications. At the time of this writing the system is undergoing its final alignments in preparation for the installation of science-grade arrays. The system optics produce point source images which exceed the survey's specifications for the camera. Final noise measurements must await the installation of the science grade arrays. Preparations are underway to take this system to the Kitt Peak 50-inch telescope for testing under conditions resembling the actual survey. The schedule for this observing run is not yet firm, but the present plan is to conduct these observations in September 1996.

Survey Telescopes:

Fabrication of the Mt. Hopkins telescope was delayed because the vendor (OSEM, Inc.) ceased operations and abandoned the telescope contract in October, 1995. The telescope purchase was protected by a bond and in February, 1996 a settlement was reached with the National Guaranty Insurance Company that resulted in the transfer of the telescope project to M3 Engineering and Technology, a respected Tucson engineering services company. It is now expected that the telescope will be delivered to Mt. Hopkins in October, 1996. Construction of the telescope building which was suspended pending resolution of the problem with OSEM is now expected to start on September 1, 1996 when the nesting season of the Mexican spotted owl ends. A drawing of the M3 telescope in the Mt. Hopkins enclosure is shown in figure 1.

The contract for the CTIO telescope was let to M3 Engineering and Technology in April 1996. M3 expects to finish the installation at CTIO in August, 1997. The CTIO telescope will be identical to the Mt. Hopkins telescope. Corning has shipped the CTIO primary mirror blank to Tucson where the generation of the sphere will begin in August. A site for the telescope at CTIO has been selected and a proposal for the construction of the building is being prepared. This site is shown in figure 2. The building dome has been ordered from Ash Manufacturing Company. Delivery is expected in October. CTIO plans to construct the building in the southern summer (October 1996-February 1997).

Data Processing and Analysis:

In addition to the external review described above, the 2MASS project has conducted a number of internal reviews during the period covered by this report. The science working group convened for a general meeting in August 1995. This meeting also included one-day preliminary design review for the extended source processing software. This review set the basic design approach for extended source extraction in 2MASS. In March 1996 another team meeting took place. Once again, one day of the meeting was reserved for a review of IPAC software development. At this meeting a critical design review of the point source extraction and positional reconstruction software took place. The design for the point source processing software presented at this meeting appears capable of exceeding the survey's specifications for both photometric and positional accuracy. At this meeting the science working group and IPAC developed a list of outstanding issues to be addressed in order to complete the design of the point source processor. At the time of this writing many of these outstanding issues have been addressed and the remainder will be closed out in the next few months. A critical design review for the extended source processor is scheduled for the end of June 1996 and a review of the pipeline architecture is scheduled for late summer 1996. Software development is on track for starting

the survey in Spring 1996 and meeting the goal of first distribution of data 18 months after the start of survey operations.

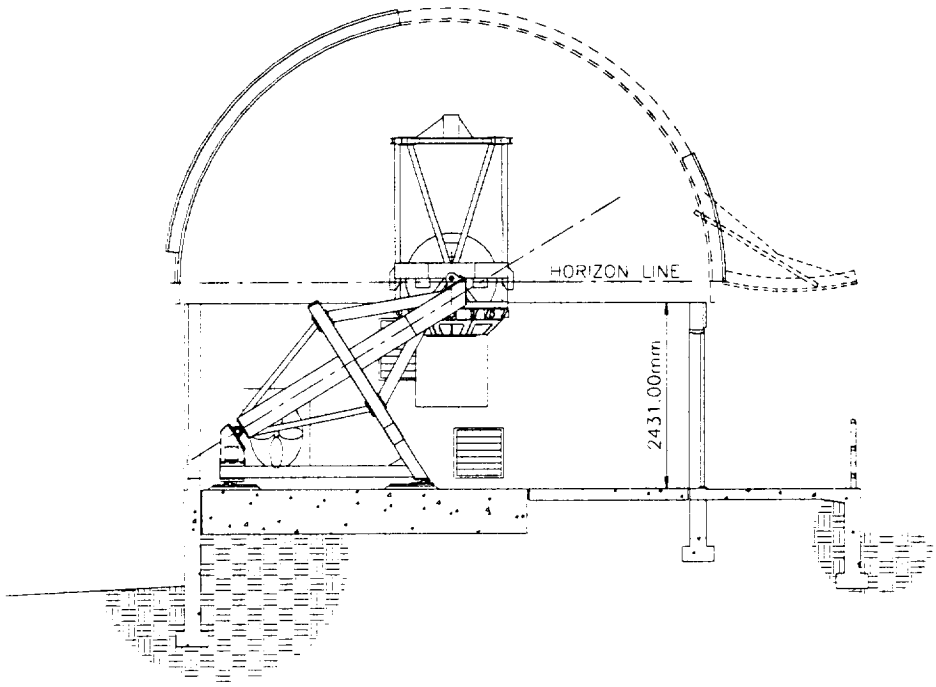

Figure 1 2MASS Mt. Hopkins telescope enclosure.

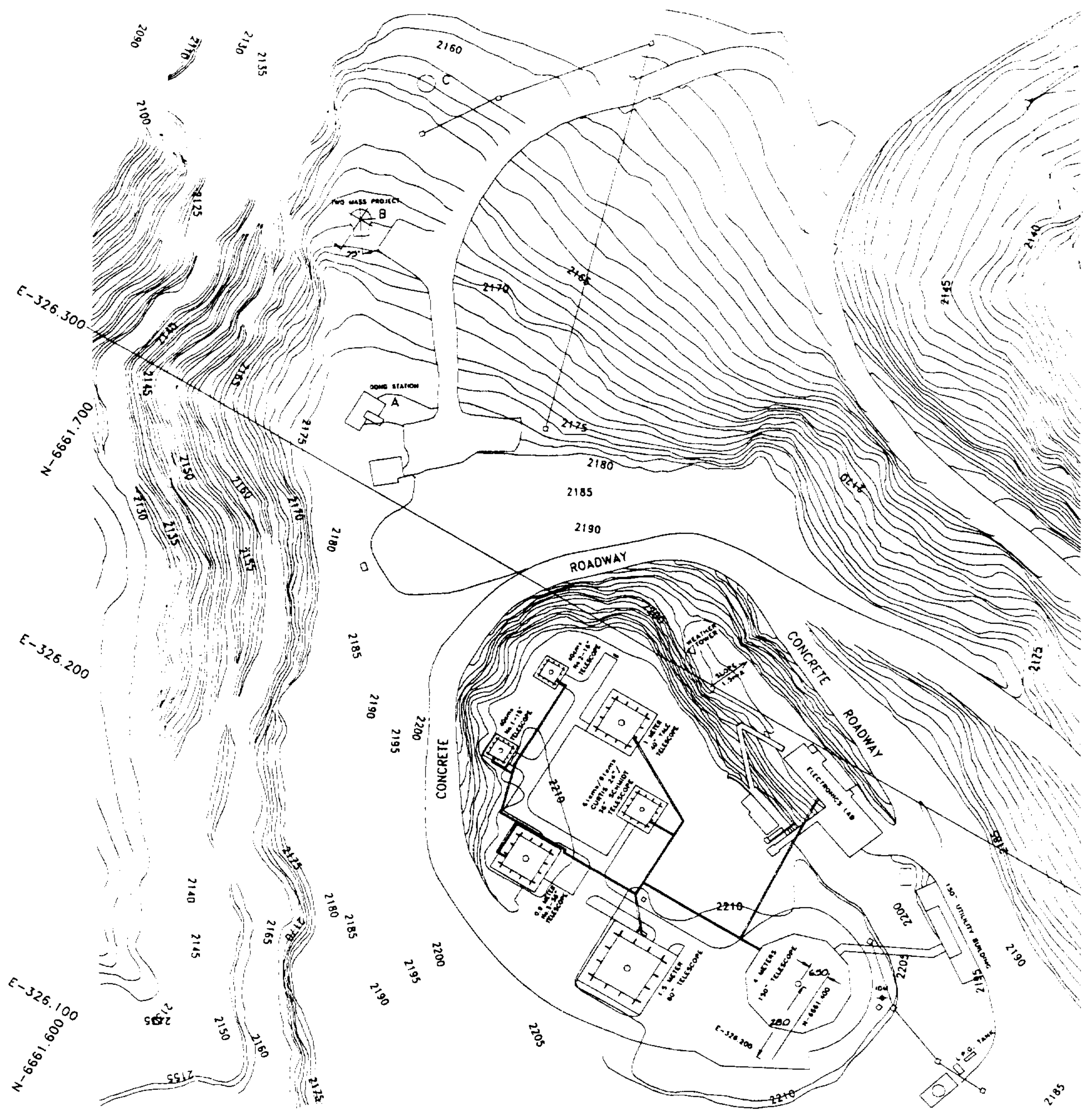

Figure 2 The 2MASS telescope site at Cerro Tololo.

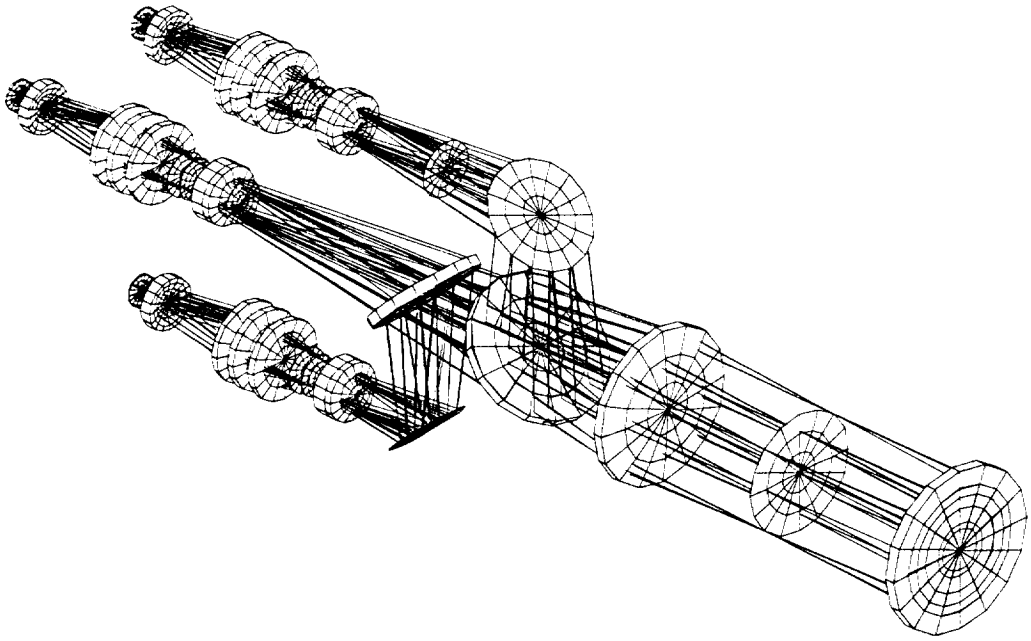

Figure 3 3-channel camera optical system.

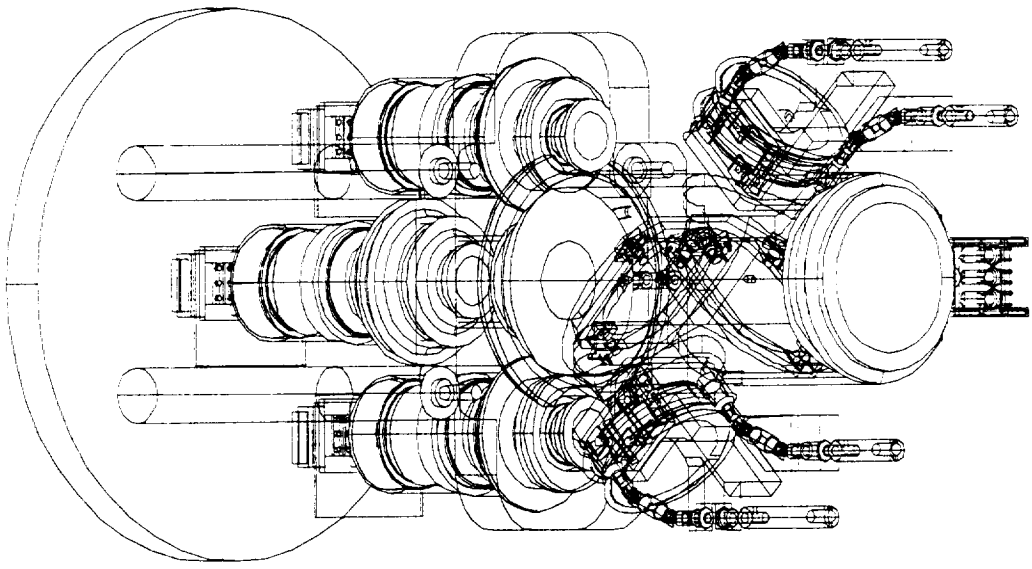

Figure 4 Camera mechanical assembly.